

# (12) UK Patent Application (19) GB (11) 2 283 755 (13) A

(43) Date of A Publication 17.05.1995

(21) Application No 9323313.8

(22) Date of Filing 11.11.1993

(71) Applicant(s)

**The Procter & Gamble Company**

**(Incorporated in USA - Ohio)**

**One Procter & Gamble Plaza, Cincinnati, Ohio 45202,  
United States of America**

(72) Inventor(s)

**Luis Carlos Dias**

**Frances Sophia Farrelly**

**Michel Joseph Giret**

(74) Agent and/or Address for Service

**Maxim Courtney Brooks**

**Procter & Gamble Limited, P O Box Forest**

**Hall No 2, Whitley Road, Longbenton,**

**NEWCASTLE UPON TYNE, NE12 9TS,**

**United Kingdom**

(51) INT CL<sup>6</sup>

**C11D 3/37 // ( C11D 1/34 1:34 )**

(52) UK CL (Edition N )

**C5D DHG D104 D123 D125 D132 D141 D142 D145 D159**

**D164 D165 D166 D167 D168 D169 D170 D171 D173**

**D179 D182**

(56) Documents Cited

**GB 2245585 A GB 2161172 A EP 0194097 A1**

**EP 0081801 A2**

(58) Field of Search

**UK CL (Edition N ) C5D DHB DHF DJB DJC**

**INT CL<sup>6</sup> C11D 3/37**

(54) Personal cleansing compositions

(57) A personal cleansing composition comprising:

(a) from 3% to 20% by weight of mono C<sub>8</sub>-C<sub>22</sub> alkyl phosphate and/or ethoxylated mono alkyl phosphate surfactant;

(b) from 0.01% to 5% by weight of water soluble skin conditioning polymer;

(c) from 1% to 10% by weight of auxiliary surfactant selected from zwitterionic, amphoteric, nonionic and non-phosphate anionic surfactants and mixtures thereof; and,

(d) water,

and wherein the ratio of phosphate ester surfactant: auxiliary surfactant is in the range from 1:2 to 10:1.

The cleansing products demonstrate excellent mildness, conditioning, moisturising benefits, stability, lathering and rinsibility.

GB 2 283 755 A

## **CLEANSING COMPOSITIONS**

### **TECHNICAL FIELD**

The present invention relates to cleansing compositions. In particular it relates to mild personal cleansing compositions with good skin feel attributes and foaming properties suitable for simultaneously cleansing and conditioning the skin and/or the hair and which may be used, for example, in the form of foam bath preparations, shower products, skin cleansers, hand, face and body cleansers, shampoos, etc.

### **Background Of The Invention**

Mild cosmetic compositions must satisfy a number of criteria including cleansing power, foaming properties and mildness/low irritancy/good feel with respect to the skin, hair and the ocular mucosae. Skin is made up of several layers of cells which coat and protect the keratin and collagen fibrous proteins that form the skeleton of its structure. The outermost of these layers, referred to as the stratum corneum, is known to be composed of 250 Å protein bundles surrounded by 80 Å thick layers. Hair similarly has a protective outer coating enclosing the hair fibre which is called the cuticle. Anionic surfactants can penetrate the stratum corneum membrane and the cuticle and, by delipidization destroy membrane integrity. This interference with skin and hair protective membranes can lead to a rough skin feel and eye irritation and may eventually permit the surfactant to interact with the keratin and hair proteins creating irritation and loss of barrier and water retention functions.

Ideal cosmetic cleansers should cleanse the skin or hair gently, without defatting and/or drying the hair and skin and without irritating the

ocular mucosae or leaving skin taut after frequent use. Most lathering soaps, shower and bath products, shampoos and bars fail in this respect.

Certain synthetic surfactants are known to be mild. However, a major drawback of most mild synthetic surfactant systems when formulated for shampooing or personal cleansing is poor lather performance compared to the highest shampoo and bar soap standards. Thus, surfactants that are among the mildest, such as sodium lauryl glyceryl ether sulfonate, (AGS), are marginal in lather. The use of known high sudsing anionic surfactants with lather boosters, on the other hand, can yield acceptable lather volume and quality but at the expense of clinical skin mildness. These two facts make the surfactant selection, the lather and mildness benefit formulation process a delicate balancing act.

Despite the many years of research that have been expended by the toiletries industry on personal cleansing, the broad mass of consumers remain dissatisfied by the skin feel, rinse characteristics and mildness of present day cleansing compositions, preferring the skin feel and rinse behaviour associated with soap-based toiletries. However, traditional soap-based personal cleansing compositions cannot deliver the mildness targets demanded by the modern consumer. Many consumers find, for example, that they have to apply a separate cosmetic lotion or cream moisturizer to the skin after using a shower or bath preparation in order to maintain skin suppleness and hydration and to counteract the delipidizing effect of the cleanser.

Thus a need exists for a synthetic-surfactant based personal cleansing products which will deliver soap-like skin feel and rinse attributes, which will not dehydrate the skin or result in loss of skin suppleness, which will provide a level of skin conditioning performance in a wash and rinse-off product which previously has been provided by a separate post-cleansing cosmetic moisturizer, which will produce a foam which is stable and of high quality, which are effective hair and skin cleansers, and which at the same time have stable product and viscosity characteristics and remain fully stable under long term and stressed temperature storage conditions.

It has now been found that personal cleansing compositions having improved "soap-like" skin feel and rinsing characteristics, as well as excellent moisturisation, dryness and smoothness attributes both in use and after use and good product stability can be formed by the use of certain combinations of mono alkyl phosphate surfactants, water-soluble skin conditioning polymers and auxiliary surfactants.

### Summary Of The Invention

The subject of the present invention is a mild, foam-producing cleansing product suitable for personal cleansing of the skin or hair and which may be used as foam bath and shower products, skin cleansers and shampoos etc. According to one aspect of the invention, there is provided a personal cleansing composition comprising:

- (a) from about 3% to about 20% by weight (acid basis) of mono C<sub>8</sub>-C<sub>22</sub> alkyl phosphate and/or ethoxylated mono C<sub>8</sub>-C<sub>22</sub> alkyl phosphate surfactant;
- (b) from about 0.01% to about 5% by weight of water soluble skin conditioning polymer;
- (c) from about 1% to about 10% by weight of auxiliary synthetic surfactant selected from zwitterionic, amphoteric, nonionic and non-phosphate anionic surfactants and mixtures thereof; and,
- (d) water,

and wherein the ratio of mono alkyl phosphate surfactant: auxiliary surfactant is in the range from about 1:2 to about 10:1.

In a highly preferred embodiment, the invention takes the form of a foam producing cleansing composition with superior skin feel and rinse characteristics, improved perceived dryness and assessed tightness and expertly graded dryness, combined with excellent lathering, good stability, cleansing ability and conditioning performance.

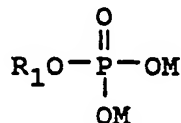
All concentrations and ratios herein are by weight of the cleansing composition, unless otherwise specified. Surfactant chain lengths are also on a weight average chain length basis, unless otherwise specified.

The cleansing compositions herein are based on a combination of C<sub>8</sub>-C<sub>22</sub> mono alkyl phosphate surfactants, water soluble skin conditioning polymers and certain auxiliary surfactants.

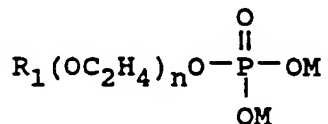
Mono alkyl phosphate surfactants are utilised in the compositions of the present invention to provide enhanced "soap-like skin feel and to impart improved product rinsibility characteristics. The total level of mono-alkyl phosphate surfactant is from about 3% to about 20%, preferably from about 3% to about 15%, more preferably from about 5% to about 12%, most preferably from about 6% to about 10% by weight. Note that all levels and ratios of phosphate surfactants are specified herein on an acid basis, ie. prior to neutralization, except where indicated otherwise.

Suitable monoalkyl phosphate surfactants for use in the compositions according to the present invention include:

- (a) mono alkyl phosphate surfactants of formula (X)



- (b) ethoxylated mono alkyl phosphate ester surfactants of formula (XI)



wherein R<sub>1</sub> is alkyl having an average chain length of from about 8 to 18 carbon atoms, preferably from about 10 to 16 carbon atoms, more preferably from about 12 to 14 carbon atoms, n is a number from 1 to 20, preferably 1 to 15, more preferably 4 to 10 and M is H, alkali metal, alkaline earth metal, ammonium or an organic base, eg. an alkanolamine such as triethanolamine or quadrol.

Preferred mono alkyl phosphate surfactants for use in the compositions according to the present invention are those of formula X in which R<sub>1</sub> is C<sub>12</sub>-C<sub>14</sub> alkyl.

Neutralization agents for the alkyl phosphate for use herein include the conventional alkali metal, alkaline earth metal and ammonium hydroxides and organic bases used in detergent manufacture. Preferred for use herein, however, is a mixture of alkali metal or ammonium hydroxide and organic base in a weight ratio (inorganic:organic) in the range from about 10:1 to about 1:1, preferably from about 5:1 to about 2:1, and especially from about 3:1 to about 2:1. The alkali metal hydroxide used herein is preferably potassium hydroxide and the organic base is preferably triethanolamine. These neutralizing agents are preferred in the compositions herein from the viewpoint of improved lather, product stability, skin feel and rinsing characteristics. Other suitable neutralizing agents include sodium hydroxide, ammonium hydroxide, monoethanolamine, diethanolamine and quadrol.

The compositions according to the present invention also include as an essential feature a water-soluble skin conditioning polymer which is preferably a cationic or nonionic polymeric skin conditioning agent and which is present at a level from about 0.01 % to about 5 %, preferably from about 0.05 % to about 3 % and especially from about 0.1 % to about 2 %. The polymer is found to be valuable for enhancing the creaminess and quality of the foam as well as providing a hair or skin conditioning utility.

Suitable polymers are high molecular weight materials (mass-average molecular weight determined, for instance, by light scattering, being generally from about 2,000 to about 3,000,000, preferably from

about 5,000 to about 1,000,000 more preferably from 100,000 to about 1,000,000).

Suitable polymers are the cationic and nonionic polymers useful in the cosmetic field. Preferred are cationic and nonionic polymers used in the cosmetic fields as hair or skin conditioning agents. Representative classes of polymers include cationic and nonionic polysaccharides; cationic and nonionic homopolymers and copolymers derived from acrylic and/or methacrylic acid; cationic and nonionic cellulose resins; cationic copolymers of dimethyldiallylammonium chloride and acrylamide and or acrylic acid; cationic homopolymers of dimethyldiallylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; quaternized silicones, and mixtures thereof.

By way of exemplification, cationic polymers suitable for use herein include cationic guar gums such as hydroxypropyl trimethyl ammonium guar gum (d.s. of from 0.11 to 0.22) available commercially under the trade names Jaguar C-14-S(RTM) and Jaguar C-17(RTM) and also Jaguar C-16(RTM), which contains hydroxypropyl substituents (d.s. of from 0.8-1.1) in addition to the above-specified cationic groups, and quaternized cellulose ethers available commercially under the trade names Ucare Polymer JR-30M, JR-400 and Celquat. Other suitable cationic polymers are homopolymers of dimethyldiallylammonium chloride available commercially under the trade name Merquat 100, copolymers of dimethyl aminoethylmethacrylate and acrylamide, copolymers of dimethyldiallylammonium chloride and acrylamide, available commercially under the trade names Merquat 550 and Merquat S, acrylic acid/dimethyldiallylammonium chloride/acrylamide copolymers available under the trade name Merquat 3300, quaternized vinyl pyrrolidone acrylate or methacrylate copolymers of amino alcohol available commercially under the trade name Gafquat, for example Polyquaternium 11, 23 and 28 (quaternized copolymers of vinyl pyrrolidone and dimethyl aminoethylmethacrylate - Gafquat 755N and HS-100), vinyl pyrrolidone/vinyl imidazolium methochloride copolymers available under the trade names Luviquat HM552, Polyquaternium 2, and polyalkyleneamines such as polyethylenimine and ethoxylated polyethylenimine.

Mild auxiliary surfactants suitable for inclusion in compositions according to the present invention can be selected from non-phosphate containing anionic, amphoteric, zwitterionic and nonionic surfactants and mixtures thereof. The ratio of (acid) phosphate surfactant: auxiliary surfactant is in the range from about 1:2 to about 10:1, preferably from about 1:1 to about 8:1, more preferably from 2:1 to 6:1. The total level of synthetic surfactant, inclusive of non-phosphate-containing anionic, nonionic, zwitterionic, amphoteric and neutralized mono-alkyl phosphate surfactant components is preferably from about 4% to about 25%, more preferably from about 6% to about 20%, and especially from about 6% to about 15% by weight. The compositions preferably comprise a mixture of anionic with zwitterionic and/or amphoteric and/or nonionic surfactants. The level of the individual auxiliary non-phosphate-containing anionic, zwitterionic, nonionic and amphoteric surfactant components is in the range from about 1% to about 8%, and especially from about 2% to about 5% by weight of the composition. The total level of auxiliary synthetic surfactant components, is preferably from about 1% to about 10%, more preferably from about 2% to about 8% by weight of composition.

Auxiliary anionic surfactants suitable for inclusion in the compositions of the invention can generally be described as mild synthetic detergent surfactants and include ethoxylated alkyl sulfates, alkyl glyceryl ether sulfonates, methyl acyl taurates, fatty acyl glycinates, N-acyl glutamates, acyl isethionates, alkyl sulfosuccinates, alpha-sulfonated fatty acids, their salts and/or their esters, alkyl ethoxy carboxylates, acyl sarcosinates and fatty acid/protein condensates, and mixtures thereof. Alkyl and/or acyl chain lengths for these surfactants are C<sub>8</sub>-C<sub>22</sub>, preferably C<sub>10</sub>-C<sub>18</sub> more preferably C<sub>12</sub>-C<sub>14</sub>.

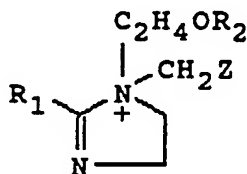
Preferred for use herein from the viewpoint of optimum mildness and lathering characteristics are the salts of sulfuric acid esters of the reaction product of 1 mole of a higher fatty alcohol and from about 1 to about 12 moles of ethylene oxide, with sodium and magnesium being the preferred counterions. Particularly preferred are the alkyl sulfates containing from about 2 to 6, preferably 2 to 4 moles of ethylene oxide,



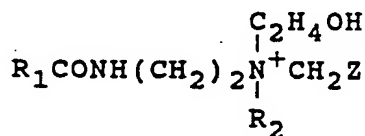
such as sodium laureth-2 sulfate, sodium laureth-3 sulfate and magnesium sodium laureth-3.6 sulfate.

The compositions for use herein suitably also contain an auxiliary amphoteric surfactant. Auxiliary amphoteric surfactants suitable for use in the compositions of the invention include:

- (a) imidazolinium surfactants of formula (I)

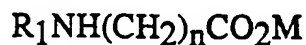


wherein  $\text{R}_1$  is C7-C22 alkyl or alkenyl,  $\text{R}_2$  is hydrogen or  $\text{CH}_2\text{Z}$ , each Z is independently  $\text{CO}_2\text{M}$  or  $\text{CH}_2\text{CO}_2\text{M}$ , and M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula (II)

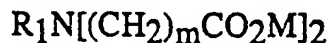


wherein  $\text{R}_1$ ,  $\text{R}_2$  and Z are as defined above;

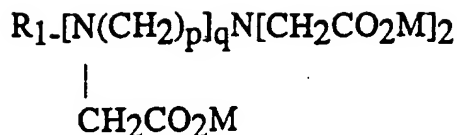
- (b) aminoalkanoates of formula (III),



iminodialkanoates of formula (IV)



and iminopolyalkanoates of formula (V)



wherein n, m, p, and q are numbers from 1 to 4, and R<sub>1</sub> and M are independently selected from the groups specified above; and

(c) mixtures thereof.

Suitable amphoteric surfactants of type (a) are marketed under the trade name Miranol and Empigen and are understood to comprise a complex mixture of species. Traditionally, the Miranols have been described as having the general formula I, although the CTFA Cosmetic Ingredient Dictionary, 3rd Edition indicates the non-cyclic structure II while the 4th Edition indicates yet another structural isomer in about R<sub>2</sub> is O-linked rather than N-linked. In practice, a complex mixture of cyclic and non-cyclic species is likely to exist and both definitions are given here for sake of completeness. Preferred for use herein, however, are the non-cyclic species.

Examples of suitable amphoteric surfactants of type (a) include compounds of formula I and/or II in which R<sub>1</sub> is C<sub>8</sub>H<sub>17</sub> (especially isocapryl), C<sub>9</sub>H<sub>19</sub> and C<sub>11</sub>H<sub>23</sub> alkyl. Especially preferred are the compounds in which R<sub>1</sub> is C<sub>9</sub>H<sub>19</sub>, Z is CO<sub>2</sub>M and R<sub>2</sub> is H; the compounds in which R<sub>1</sub> is C<sub>11</sub>H<sub>23</sub>, Z is CO<sub>2</sub>M and R<sub>2</sub> is CH<sub>2</sub>CO<sub>2</sub>M; and the compounds in which R<sub>1</sub> is C<sub>11</sub>H<sub>23</sub>, Z is CO<sub>2</sub>M and R<sub>2</sub> is H.

In CTFA nomenclature, materials suitable for use in the present invention include cocoamphocarboxypropionate, cocoamphocarboxy propionic acid, and especially cocoamphoacetate and cocoamphodiacetate (otherwise referred to as cocoamphocarboxyglycinate). Specific commercial products include those sold under the trade names of Ampholak 7TX (sodium carboxy methyl tallow polypropyl amine), Empigen CDL60 and CDR 60 (Albright & Wilson), Miranol H2M Conc. Miranol C2M Conc. N.P., Miranol C2M Conc. O.P., Miranol C2M SF,

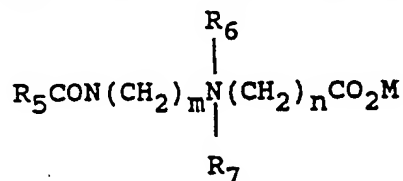
Miranol CM Special (Rhône-Poulenc); Alkateric 2CIB (Alkaril Chemicals); Amphoterger W-2 (Lonza, Inc.); Monateric CDX-38, Monateric CSH-32 (Mona Industries); Rewoteric AM-2C (Rewo Chemical Group); and Schercotic MS-2 (Scher Chemicals).

It will be understood that a number of commercially-available amphoteric surfactants of this type are manufactured and sold in the form of electroneutral complexes with, for example, hydroxide counterions or with anionic sulfate or sulfonate surfactants, especially those of the sulfated C<sub>8</sub>-C<sub>18</sub> alcohol, C<sub>8</sub>-C<sub>18</sub> ethoxylated alcohol or C<sub>8</sub>-C<sub>18</sub> acyl glyceride types. Preferred from the viewpoint of mildness and product stability, however, are compositions which are essentially free of (non-ethoxylated) sulfated alcohol surfactants. Note also that the concentrations and weight ratios of the amphoteric surfactants are based herein on the uncomplexed forms of the surfactants, any anionic surfactant counterions being considered as part of the overall anionic surfactant component content.

Examples of preferred amphoteric surfactants of type (b) include N-alkyl polytrimethylene poly-carboxymethylamines sold under the trade names Ampholak X07 and Ampholak 7CX by Berol Nobel and also salts, especially the triethanolammonium salts and salts of N-lauryl-beta-amino propionic acid and N-lauryl-imino-dipropionic acid. Such materials are sold under the trade name Deriphat by Henkel and Mirataine by Rhône-Poulenc.

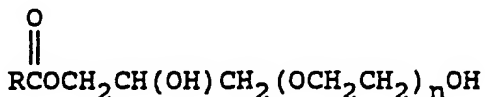
The compositions herein can also contain an auxiliary zwitterionic surfactant, especially an alkyl betaine or amido betaine surfactant.

Auxiliary betaine surfactants suitable for inclusion in the composition of the invention include alkyl betaines of the formula  $R_5R_6R_7N^+(CH_2)_nCO_2M$  (VIII) and amido betaines of the formula (IX)



wherein  $R_5$  is  $C_{12}$ - $C_{22}$  alkyl or alkenyl,  $R_6$  and  $R_7$  are independently  $C_1$ - $C_3$  alkyl,  $M$  is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium, and  $n, m$  are each numbers from 1 to 4. Preferred betaines include cocoamidopropyldimethylcarboxymethyl betaine, laurylamidopropyldimethylcarboxymethyl betaine and Tego betaine.

The compositions of the invention can also contain nonionic surfactants, especially oil derived nonionic surfactants and mixtures thereof. Oil derived nonionic surfactants can be of value in compositions according to the invention for the provision of skin feel benefits both in use and after use. Suitable oil derived nonionic surfactants for use herein include water soluble vegetable and animal-derived emollients such as triglycerides with a polyethyleneglycol chain inserted; ethoxylated mono and di-glycerides, polyethoxylated lanolins and polyethoxylated butter derivatives. One preferred class of oil-derived nonionic surfactants for use herein have the general formula (VI)



wherein  $n$  is from about 5 to about 200, preferably from about 20 to about 100, more preferably from about 30 to about 85, and wherein  $R$  comprises an aliphatic radical having on average from about 5 to 20 carbon atoms, preferably from about 9 to 18 carbon atoms.

Suitable ethoxylated oils and fats of this class include polyethyleneglycol derivatives of glyceryl cocoate, glyceryl caproate, glyceryl caprylate, glyceryl tallowate, glyceryl palmitate, glyceryl stearate, glyceryl laurate, glyceryl oleate, glyceryl ricinoleate, and glyceryl fatty esters derived from triglycerides, such as palm oil, almond oil, and corn oil, preferably glyceryl tallowate and glyceryl cocoate.

Suitable oil derived nonionic surfactants of this class are available from Croda Inc. (New York, USA) under their Crovol line of materials such as Crovol EP40 (PEG 20 evening primrose glyceride), Crovol EP 70

(PEG 60 evening primrose glyceride) Crovol A-40 (PEG 20 almond glyceride), Crovol A-70 (PEG 60 almond glyceride), Crovol M-40 (PEG 20 maize glyceride), Crovol M-70 (PEG 60 maize glyceride), Crovol PK-40 (PEG 12 palm kernel glyceride), and Crovol PK-70 (PEG 45 palm kernel glyceride) and under their Solan range of materials such as Solan E, E50 and X polyethoxylated lanolins and Aqualose L-20 (PEG 24 lanolin alcohol) available from Westbrook Lanolin. Further suitable surfactants of this class are commercially available from Sherex Chemical Co. (Dublin, Ohio, USA) under their Varonic LI line of surfactants. These include, for example, Varonic LI 48 (polyethylene glycol ( $n=80$ ) glyceryl tallowate, alternatively referred to as PEG 80 glyceryl tallowate), Varonic LI 2 (PEG 28 glyceryl tallowate), Varonic LI 420 (PEG 200 glyceryl tallowate), and Varonic LI 63 and 67 (PEG 30 and PEG 80 glyceryl cocoates). Other oil-derived emollients suitable for use are PEG derivatives of corn, avocado, and babassu oil, as well as Softigen 767 (PEG(6) caprylic/capric glycerides).

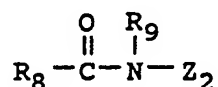
Also suitable for use herein are nonionic surfactants derived from composite vegetable fats extracted from the fruit of the Shea Tree (*Butyrospermum Karkii* Kotschy) and derivatives thereof. This vegetable fat, known as Shea Butter is widely used in Central Africa for a variety of means such as soap making and as a barrier cream, it is marketed by Sederma (78610 Le Perray En Yvelines, France). Particularly suitable are ethoxylated derivatives of Shea butter available from Karlshamn Chemical Co. (Columbos, Ohio, USA) under their Lipex range of chemicals, such as Lipex 102 E-75 (ethoxylated mono, di-glycerides of Shea butter). Similarly, ethoxylated derivatives of Mango, Cocoa and Illipe butter may be used in compositions according to the invention. Although these are classified as ethoxylated nonionic surfactants it is understood that a certain proportion may remain as non-ethoxylated vegetable oil or fat.

Other suitable oil-derived nonionic surfactants include ethoxylated derivatives of almond oil, peanut oil, rice bran oil, wheat germ oil, linseed oil, jojoba oil, oil of apricot pits, walnuts, palm nuts, pistachio nuts, sesame seeds, rapeseed, cade oil, corn oil, peach pit oil, poppyseed

oil, pine oil, castor oil, soybean oil, avocado oil, safflower oil, coconut oil, hazlenut oil, olive oil, grapeseed oil, and sunflower seed oil.

Oil derived nonionic surfactants highly preferred for use herein from the viewpoint of optimum mildness and skin feel characteristics are PEG 60 evening primrose triglycerides; PEG 55 lanolin polyethoxylated derivatives and ethoxylated derivatives of Shea butter.

In addition to the above oil derived nonionic surfactants, the compositions of the invention can also comprise C<sub>12</sub>-C<sub>14</sub> fatty acid mono-and diethanolamides, sucrose polyester surfactants and polyhydroxy fatty acid amide surfactants having the general formula (VII).



The preferred polyhydroxy fatty acid amide surfactants are those in which R<sub>9</sub> is C<sub>1-4</sub> alkyl, preferably methyl, and R<sub>8</sub> is C<sub>7</sub>-C<sub>19</sub> alkyl or alkenyl, more preferably straight-chain C<sub>9</sub>-C<sub>17</sub> alkyl or alkenyl, or mixture thereof; and Z<sub>2</sub> is a polyhydroxyhydrocarbyl having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain, or an alkoxyated derivative (preferably ethoxylated or propoxylated) thereof. Z<sub>2</sub> preferably will be derived from a reducing sugar in a reductive amination reaction; more preferably Z<sub>2</sub> is a glycityl. Suitable reducing sugars include glucose, fructose, maltose, lactose, galactose, mannose, and xylose. As raw materials, high dextrose corn syrup, high fructose corn syrup, and high maltose corn syrup can be utilized as well as the individual sugars listed above. These corn syrups may yield a mix of sugar components for Z<sub>2</sub>. It should be understood that it is by no means intended to exclude other suitable raw materials. Z<sub>2</sub> preferably will be selected from the group consisting of -CH<sub>2</sub>(CHOH)<sub>n</sub>-CH<sub>2</sub>OH, -CH(CH<sub>2</sub>OH)-(CHOH)<sub>n-1</sub>-CH<sub>2</sub>OH, -CH<sub>2</sub>-(CHOH)<sub>2</sub>(CHOR')(CHOH)-CH<sub>2</sub>OH, where n is an integer from 3 to 5, inclusive, and R' is H or a cyclic or aliphatic monosaccharide, and alkoxyated derivatives thereof. Most preferred are glycityls wherein n is 4, particularly -CH<sub>2</sub>-(CHOH)<sub>4</sub>-CH<sub>2</sub>OH.

The most preferred polyhydroxy fatty acid amide has the formula  $R_8(CO)N(CH_3)CH_2(CHOH)_4CH_2OH$  wherein  $R_8$  is a C11-C17 straight chain alkyl or alkenyl group.

The compositions of the invention may also contain saturated acyl fatty acids having a weight average chain length of from 10 to 18, preferably from 12 to 16 carbon atoms. Highly preferred is myristic acid. The fatty acid is suitably added in a level of from about 0.1 to about 5% by weight and may be neutralized or partially neutralized with alkali or organic base in order to form soap.

The compositions of the invention may also include an insoluble perfume or cosmetic oil or wax or a mixture thereof at a level up to about 10%, preferably up to about 3% by weight wherein the oil or wax is insoluble in the sense of being insoluble in the product matrix at a temperature of 25°C. Addition of such oils or waxes can provide emolliency, mildness and rinsibility characteristics to personal cleansing compositions according to the invention. It is a feature of the invention, however, that compositions having excellent emolliency and mildness together with desirable physical attributes (clarity etc.) can be delivered which are essentially oil-free, ie which contain less than about 1%, preferably less than 0.5% by weight of an added oil phase. Physically, preferred compositions of this type take the form of an optically-clear solution or microemulsion. In compositions including an additional perfume or cosmetic oil or wax, preferably the weight ratio of nonionic surfactant to added oil is at least about 1:2, more especially at least about 3:1.

Suitable insoluble cosmetic oils and waxes for use herein can be selected from water-insoluble silicones inclusive of non-volatile polyalkyl and polyaryl siloxane gums and fluids, volatile cyclic and linear polyalkylsiloxanes, polyalkoxylated silicones, amino and quaternary ammonium modified silicones, rigid cross-linked and reinforced silicones and mixtures thereof, C<sub>1</sub>-C<sub>24</sub> esters of C<sub>8</sub>-C<sub>30</sub> fatty acids such as isopropyl myristate, myristyl myristate and cetyl ricinoleate, C<sub>8</sub>-C<sub>30</sub>

esters of benzoic acid, beeswax, saturated and unsaturated fatty alcohols such as behenyl alcohol, hydrocarbons such as mineral oils, petrolatum, squalane and squalene, polybutene, fatty sorbitan esters (see US-A-3988255, Seiden, issued October 26th 1976), lanolin and oil-like lanolin derivatives, animal and vegetable triglycerides such as almond oil, peanut oil, wheat germ oil, rice bran oil, linseed oil, jojoba oil, oil of apricot pits, walnuts, palm nuts, pistachio nuts, sesame seeds, rapeseed, cade oil, corn oil, peach pit oil, poppyseed oil, pine oil, castor oil, soybean oil, avocado oil, safflower oil, coconut oil, hazlenut oil, olive oil, grapeseed oil, and sunflower seed oil, and C<sub>1</sub>-C<sub>24</sub> esters of dimer and trimer acids such as diisopropyl dimerate, diisostearylmalate, diisostearyldimerate and triisostearyltrimerate.

The viscosity of the final composition (Brookfield RVT DCP, 1rpm with Cone CP41 or CP52, 25°C, neat) is preferably at least about 500 cps, more preferably from about 1,000 to about 50,000 cps, especially from about 2,000 to about 30,000 cps, the viscosity being controlled using conventional hydrophilic gelling agents and thickeners.

The compositions of the invention thus can also contain a hydrophilic gelling agent at a level preferably from about 0.01% to about 10%, more preferably from about 0.02% to about 2%, and especially from about 0.02% to about 0.5%. The gelling agent preferably has a viscosity (1% aqueous solution, 20°C, Brookfield RVT) of at least about 4000 mPa.s, more preferably a least about 10,000 mPa.s and especially at least 50,000 mPa.s.

Suitably hydrophilic gelling agents can generally be described as water-soluble or colloiddally water-soluble polymers, and include cellulose ethers (e.g. hydroxyethyl cellulose, methyl cellulose, hydroxypropylmethyl cellulose), polyvinylpyrrolidone, polyvinylalcohol, guar gum, hydroxpropyl guar gum and xanthan gum.

Preferred hydrophilic gelling agents herein, however, are acrylic acid/ethyl acrylate copolymers and the carboxyvinyl polymers sold by the B.F. Goodrich Company under the trade mark of Carbopol resins. These resins consist essentially of a colloiddally water-soluble polyalkenyl



polyether crosslinked polymer of acrylic acid crosslinked with from 0.75% to 2.00% of a crosslinked agent such as for example polyallyl sucrose or polyallyl pentaerythritol. Examples include Carbopol 934, Carbopol 940, Carbopol 950, Carbopol 980, Carbopol 951 and Carbopol 981. Carbopol 934 is a water-soluble polymer of acrylic acid crosslinked with about 1% of a polyallyl ether of sucrose having an average of about 5.8 allyl groups for each sucrose molecule. A most preferred polymer is Carbopol 951. Also suitably for use herein are hydrophobically-modified cross-linked polymers of acrylic acid having amphipathic properties available under the Trade Name Carbopol 1382, Carbopol 1342 and Pemulen TR-1 (CFTA Designation: Acrylates/10-30 Alkyl Acrylate Crosspolymer). A combination of the polyalkenyl polyether cross-linked acrylic acid polymer and hydrophobically modified cross-linked acrylic acid polymer is also suitable for use herein. The gelling agents herein are particularly valuable for providing excellent stability characteristics over both normal and elevated temperatures.

Neutralizing agents suitable for use in neutralizing acidic group containing hydrophilic gelling agents herein include sodium hydroxide, potassium hydroxide, ammonium hydroxide, monoethanolamine, diethanolamine and triethanolamine.

The cleansing compositions can optionally include other hair or skin moisturizers which are soluble in the cleansing composition matrix. The preferred level of such moisturizers is from about 0.5% to about 20% by weight. In preferred embodiments, the moisturizer is selected from:

1. water-soluble liquid polyols;
2. essential amino acid compounds found naturally occurring in the stratum corneum of the skin; and
3. water-soluble nonpolyol nonocclusives and mixtures thereof.

Some examples of more preferred nonocclusive moisturizers are polybutene, squalane, glycerine, polyethylene glycol, propylene glycol, sorbitol, polyethylene glycol and propylene glycol ethers of methyl glucose (e.g. ethyl glucam E-20 and propylglucan P-10), polyethylene

glycol and propylene glycol ethers of lanolin alcohol (e.g. Solulan-75), sodium pyrrolidone carboxylic acid, L-proline, guanidine, pyrrolidone, hydrolyzed protein and other collagen-derived proteins, aloe vera gel and acetamide MEA and mixtures thereof. Of the above, glycerine is highly preferred.

A number of additional optional materials can be added to the cleansing compositions each at a level of from about 0.1% to about 2% by weight. Such materials include proteins and polypeptides and derivatives thereof; water-soluble or solubilizable preservatives such as DMDM Hydantoin, Germall 115, methyl, ethyl, propyl and butyl esters of hydroxybenzoic acid, EDTA, Euxyl (RTM) K400, natural preservatives such as benzyl alcohol, potassium sorbate and bisaballo; sodium benzoate and 2-phenoxyethanol; other moisturizing agents such as hyaluronic acid, chitin, and starch-grafted sodium polyacrylates such as Sanwet (RTM) IM-1000, IM-1500 and IM-2500 available from Celanese Superabsorbent Materials, Portsmouth, VA, USA and described in US-A-4,076,663; solvents such as hexylene glycol and propylene glycol; anti-bacterial agents such as Oxeco (phenoxy isopropanol); low temperature phase modifiers such as ammonium ion sources (e.g.  $\text{NH}_4\text{Cl}$ ); viscosity control agents such as magnesium sulfate and other electrolytes; colouring agents; pearlescers and opacifiers such as ethylene glycol distearate,  $\text{TiO}_2$  and  $\text{TiO}_2$ -coated mica; perfumes and perfume solubilizers; and zeolites such as Valfour BV400 and derivatives thereof and  $\text{Ca}^{2+}/\text{Mg}^{2+}$  sequestrants such as polycarboxylates, amino polycarboxylates, polyphosphonates, amino polyphosphonates and gluconates etc. Water is also present at a level preferably of from about 45% to about 95% preferably at least about 60% by weight of the compositions herein.

The pH of the compositions is preferably from about 4 to about 10, preferably from about 6 to about 9.

The invention is illustrated by the following non-limiting examples.

In the examples, all concentrations are on a 100% active basis and the abbreviations have the following designation:

MAP	Mono C <sub>12</sub> -C <sub>14</sub> alkyl phosphoric acid
Amphoteric	Cocoamphodiacetate
Anionic	Sodium lauroyl sarcosinate
MA	Myristic Acid
CA	Cetyl Alcohol
GA	Polyhydroxy fatty acid amide of formula VII in which R <sub>8</sub> is C <sub>11</sub> -C <sub>17</sub> alkyl, R <sub>9</sub> is methyl, and Z <sub>2</sub> is CH <sub>2</sub> (CHOH) <sub>4</sub> CH <sub>2</sub> OH
Benzoate	C <sub>12</sub> -C <sub>15</sub> alkyl benzoate
Betaine	Cocoamidopropyl betaine
Polymer	Polymer JR-400 - hydroxyethylcellulose reacted with epichlorohydrin and quaternized with trimethylamine, m.wt. 4 x 10 <sup>6</sup>
Preservative	Phenoxyethanol/Sodium benzoate/EDTA (4:2:1)
Pearlescer	Ethyleneglycoldistearate/emulsifier mixture
Oil	Soyabean oil
Softigen 767	PEG(6) caprylic/capric glycerides
Neutralizer	4:1 mix of KOH and triethanolamine (TEA)

**Examples I to VI**

The following are personal cleansing compositions in the form of shower gel or bath foam products and which are representative of the present invention:

	I	II	III	IV	V	VI
MAP	6.0	8.0	15.0	10.0	10.0	8.0
Amphoteric	3.0	3.0	-	-	-	4.0
Anionic	1.5	6.0	-	-	2.0	4.0
GA	2.7	-	-	-	-	2.0
Betaine	3.0	-	4.0	3.0	3.0	-
Oil	-	-	4.0	-	-	-
Softigen 767	2.5	3.0	-	1.0	2.0	-
MA	1.0	1.0	3.0	4.0	2.0	1.0
CA	1.0	-	-	-	-	1.0
Polymer	1.0	1.0	0.5	0.5	1.0	1.0
Pearlescer	1.0	1.0	3.0	3.0	1.0	1.0
Preservative	1.0	1.0	1.0	1.0	1.0	1.0
Perfume	1.0	1.0	1.0	1.0	1.0	1.0
Glycerine	3.0	3.0	-	1.0	-	-
Benzoate	1.0	-	-	1.0	1.0	-

Polybutene	-	-	-	-	2.0	-
Carbomer 1382	0.3	0.5	0.6	0.5	0.5	0.4
Neutralizer to pH	7.0	8.5	8.5	8.5	8.5	7.0
Water	----- to 100 -----					

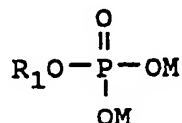
Compositions I to VI are prepared by forming a surfactant phase A at 60°C containing a portion of the water, the anionic, zwitterionic, amphoteric and nonionic surfactants, the neutralizing agent and the remaining water-soluble, oil-insoluble ingredients. In compositions which comprise water-insoluble ingredients an oil phase B is formed from these oil-soluble ingredients which is then admixed with A at about 60°C and rapidly cooled to ambient temperature. Finally the remaining water, preservative and perfume are added. The final product pH is controlled by the addition of the neutralizing agent (a 4:1 KOH/TEA base mix) in the appropriate level.

The products provide excellent in-use and efficacy benefits including mildness, soap-like skin feel during and after use, skin moisturising and dryness, stability, cleansing, lathering and rinsibility.

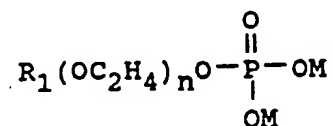
**CLAIMS**

1. A personal cleansing composition comprising:
  - (a) from about 3% to about 20% by weight (acid basis) of mono C<sub>8</sub>-C<sub>22</sub> alkyl phosphate and/or ethoxylated mono C<sub>8</sub>-C<sub>22</sub> alkyl phosphate surfactant;
  - (b) from about 0.01% to about 5% by weight of water soluble skin conditioning polymer;
  - (c) from about 1% to about 10% by weight of auxiliary synthetic surfactant selected from zwitterionic, amphoteric, nonionic and non-phosphate anionic surfactants and mixtures thereof; and,
  - (d) water,

and wherein the ratio of mono alkyl phosphate surfactant: auxiliary surfactant is in the range from about 1:2 to about 10:1.
2. A composition according to Claim 1 wherein the composition has a viscosity (Brookfield RVT DCP 1 rpm with Cone CP41 or CP52, 25°C, neat) in the range from 1,000 to 50,000 cps .
3. A composition according to Claim 1 or 2 wherein the mono alkyl phosphate surfactant has the general formula (X).



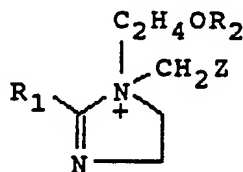
or the general formula (XI)



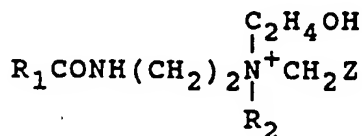
wherein R<sub>1</sub> is alkyl having an average chain length of from about 8 to 18 carbon atoms, preferably from about 10 to 16 carbon atoms, more preferably from about 12 to 14 carbon atoms, n is a number from 1 to 20, preferably 1 to 15, more preferably 4 to 10 and M is H, alkali metal, alkaline earth metal, ammonium or an organic base.

4. A composition according to any of Claims 1 to 3 wherein the mono alkyl phosphate surfactant is at a level of from about 3% to about 15%, preferably from 5% to about 12%, more preferably from about 6% to about 10% by weight.
5. A composition according to any of Claims 1 to 4 wherein the mono alkyl phosphate surfactant has formula X in which R<sub>1</sub> is C<sub>12</sub> to C<sub>14</sub>-alkyl.
6. A composition according to any of Claims 1 to 5 wherein the level of water soluble skin conditioning polymer is from about 0.05% to about 3%, preferably from about 0.1% to about 2% by weight.
7. A composition according to any of Claims 1 to 6 wherein the water soluble skin conditioning polymer is selected from cationic and nonionic polysaccharides; cationic and nonionic homopolymers and copolymers derived from acrylic and/or methacrylic acid, cationic and nonionic cellulose resins; cationic copolymers of dimethyldiallylammonium chloride and acrylic acid; cationic homopolymers of dimethyldiallylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; quaternized silicones, and mixtures thereof.
8. A composition according to any of Claims 1 to 7 wherein the weight ratio of mono alkyl phosphate surfactant: water soluble skin conditioning polymer is in the range from 2:1 to about 50:1.

9. A composition according to any of Claims 1 to 8 where the level of the auxiliary surfactant is in the range from about 2% to about 8% by weight.
10. A composition according to Claims 1 to 9 wherein the anionic surfactant is selected from ethoxylated alkyl sulfates, alkyl glyceryl ether sulfonates, methyl acyl taurates, fatty acyl glycinate, alkyl ethoxy carboxylates, N-acyl glutamates, acyl isethionates, alkyl sulfosuccinates, alpha-sulfonated fatty acids, their salts and/or their esters, acyl sarcosinates and fatty acid/protein condensates, and mixtures thereof.
11. A composition according to any Claims 1 to 10 wherein the amphoteric surfactant is selected from:
  - (a) imidazolinium derivatives of formula (I)



wherein  $R_1$  is C7-C22 alkyl or alkenyl,  $R_2$  is hydrogen or  $CH_2Z$ , each Z is independently  $CO_2M$  or  $CH_2CO_2M$ , and M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula (II)



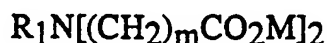
wherein  $R_1$ ,  $R_2$  and Z are as defined above:



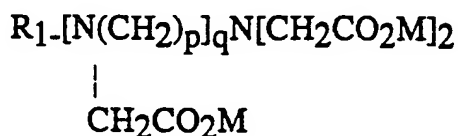
(b) aminoalkanoates of formula (III),



iminodialkanoates of formula (IV)



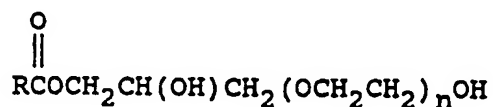
and iminopolyalkanoates of formula (V)



wherein n, m, p, and q are numbers from 1 to 4, and  $R_1$  and M are independently selected from the groups specified in (a) above; and

(c) mixtures thereof.

12. A composition according to Claim 11 wherein the amphoteric is selected from the imidazolinium derivatives of formula I and/or ammonium derivatives of formula II.
13. A composition according to any of Claims 1 to 12 wherein the zwitterionic surfactant is selected from alkyl and amido betaines.
14. A composition according to any of Claims 1 to 13 wherein the nonionic surfactant comprises one or more ethoxylated oils or fats having the formula (VI)



wherein n is from about 5 to about 200, preferably from about 20 to about 100, more preferably from about 30 to about 85, and

wherein R comprises an aliphatic radical having an average from about 5 to 20 carbon atoms, preferably from about 9 to 20 carbon atoms, more preferably from about 11 to 18 carbon atoms, most preferably from about 12 to 16 carbon atoms and/or C<sub>12</sub>-C<sub>14</sub> fatty acid mono- and diethanolamides and polyhydroxy fatty acid amide surfactant.

15. A composition according to any of Claims 1 to 14 which is in the form of an optically clear solution or microemulsion.
16. A composition according to any of Claims 1 to 15 additionally comprising moisturiser selected from glycerin, polyethylene glycol, propylene glycol, sorbitol, polyethylene glycol and polypropylene glycol ethers of methyl glucose, sodium pyrrolidone carboxylic acid, L-proline and mixtures thereof.
17. A composition according to any of Claims 1 to 16 wherein the alkylphosphate surfactant is neutralized with a mixture of alkali metal or ammonium hydroxide and organic base in a weight ratio (inorganic:organic) in the range from about 10:1 to about 1:1.

**Patents Act 1977****Examiner's report to the Comptroller under Section 17  
(The Search report)**Application number  
GB 9323313.8**Relevant Technical Fields**

(i) UK Cl (Ed.N) C5D DHF, DHB, DJC, DJB

(ii) Int Cl (Ed.6) C11D 3/37

Search Examiner  
M ELLIOTTDate of completion of Search  
20 JANUARY 1995**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant  
following a search in respect of  
Claims :-  
1-17**Categories of documents**

- X:** Document indicating lack of novelty or of inventive step.      **P:** Document published on or after the declared priority date but before the filing date of the present application.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.      **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art.      **&:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2245585 A	(KAO CORPORATION) whole document	1 at least
X	GB 2161172 A	(BEECHAM GROUP PLC) whole document	1 at least
X	EP 0194097 A1	(THE PROCTOR AND GAMBLE CO) whole document	1 at least
X	EP 0081801 A2	(KAO CORPORATION) whole document	1 at least

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).